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| (54) Title: COMPOSITION HAVING THERAPEUTIC AND/OR NUTRITIONALLY ACTIVE SUBSTITUENT (57) Abstract The invention relates to compositions having a nutritionally beneficial substituent and a substituent that stimulates a short and/or long term psychological feedback and to vehicles or devices that accomplish the delivery of the nutritionally beneficial substituent to a recipient. | | |

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et al.) describes piperine-containing compositions. U.S. Patent 5,290,605 (Shapira) concerns a nutritional soft drink whose ingredients are said to provide protection from UV damage. The composition contains a carotenoid mix and optionally, fruit/vegetable juices and/or herbal preparations. U.S. Patent 5,240,732 (Ueda) concerns plant extract-containing beverages supplemented with a sugar-alcohol.

Nutritional supplements having psychological feedback properties have also been described. U.S. Patents 5,681,569 (Kuznicki *et al.*) and 4,946,701 (Tsai *et al.*) both concern beverage compositions that contain green tea extracts. U.S. Patent 5,674,522 (Shah *et al.*) concerns a powdered concentrate containing one or more pharmacologically active agents for use in hot beverages. The composition may contain caffeine, as well as vitamins and minerals. U.S. Patent 5,571,441 (Andon *et al.*) is directed to nutritional supplements compositions that provide psychological feedback.

The disclosed compositions contain vitamins and/or minerals as well as xanthine alkaloids (such as caffeine, etc.) that provide a physiological signal. U.S. Patent 5,114,723 (Stray-Gundersen) concerns hypotonic beverages for supplying physiologically essential electrolytes, nutrient minerals, carbohydrates and other ingredients to a consumer. The patent discloses that caffeine may be added to the beverage formulation. U.S. Patent 4,992,282 (Mehansho *et al.*) concerns vitamin and mineral-fortified beverages, which may be supplemented with caffeine. U.S. Patent 4,612,205 (Kupper *et al.*) concerns fruit-flavored carbonated beverages that may be supplemented with caffeine. U.S. Patent 4,061,797 (Hannan, Jr. *et al.*) concerns non-carbonated, caffeinated fruit beverages.

U.S. Patent 4,737,375 (Nakel *et al.*) describes calcium-supplemented beverages. U.S. Patent 4,769,244 (Lavie) describes non-hygroscopic water-soluble pulverulent compositions that may be employed to make beverages.

Compositions for accomplishing transdermal delivery of pharmaceuticals have also been described (see, for example, U.S. Patents 5,718,914 (Foldvari), 5,698,217 (Wilking), 5,721,257 (Baker), 5,683,713 (Blank *et al.*), and 4,788,189 (Glazer)).

The present invention provides an improved composition for accomplishing the delivery of nutritionally beneficial substituents. In a preferred embodiment, the present invention additionally provides an improved formulated beverage that provides at least one, and most preferably multiple, short and long term psychological feedback(s) to the consumer.

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SUMMARY OF THE INVENTION:

Conventional or traditional beverages are formulated to provide external sensory appeal (such as taste, sight, or smell). In contrast to such compositions, the present invention provides beverages and other compositions that are formulated to provide internal appeal directly to the brain (i.e., brain rewards). The present invention thus relates to a formulated, defined composition having a nutritionally beneficial substituent and a long and/or short term substituent that stimulates psychological feedback and to vehicles or devices that accomplish the delivery of the nutritionally beneficial substituent. Such preferred compositions will typically possess a nutritionally beneficial substituent and both a long term and a short term substituent that stimulates psychological feedback and which accomplishes the delivery of the nutritionally beneficial substituent. Preferred vehicles include oral and/or translingual delivery vehicles, such as beverages, elixirs, lozenges, chewable tablets, and the like, and transdermal delivery devices such as patches, bandages, etc.

In detail, the invention provides a composition (preferably a formulated beverage) (most preferably, substantially alcohol-free) for oral human consumption having a defined composition of substituents comprising:

at least one nutritionally beneficial substituent (A) selected from the group consisting of:

Adrenochrome Semicarbazone; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluoro-tryptophan; 6-fluorotryptophan; tryptophan; acetosalicylic acid; ibuprophen; acetaminophen; alfalfa; allocryptine; beta-carotene; calcium; caffeine; theophylline; theobromine; choline; chromium picolinate; chromium polynicotinate; diadzin; diadzein; damiana; turnera diffusa; dandelion; evening primrose oil; folic acid; GABA; ginger; ginkgo biloba; ginseng; glutathione; cysteine; L-glutamine; glycine; N-acetylcysteine; L-cysteine and L-methionine; S-adenosylmethionine; green tea; guarana; hops; inositol; iron; kava kava; kombucha tea; kudzu; lobelia; glutamic acid; D-phenylalanine; DL-phenylalanine; L-tyrosine; lecithin; linoleic acid; gamma-linoleic acid; magnesium; milk thistle extract (silymarin); niacin; PABA; protopine; puerarin; pyridoxal-5-phosphate; selenium; soluble fiber; St. Johnswort; taurine; sucrose; fructose; glucose; yellow dock; zinc and zinc picolinate; and zinc polynicotinate;

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the substituent being present in an amount sufficient to provide a nutritional benefit to the human recipient; and
at least one additional substituent (B) that provides traditional psychological feedback selected from the group consisting of:

5 caffeine or a caffeine equivalent; tryptophan; ephedra; cola; green tea extract; carbonic acid; phosphoric acid; citric acid; hops; cocoa; chocolate; an anandamide; quinine; malic acid; a sweetener; a fruit juice or fruit juice extract; milk; a vegetable juice or vegetable juice extract; kudzu and 5-hydroxy-tryptophan;

10 the substituent being present in an amount sufficient to provide a sensory psychological feedback.

The invention further provides the above-indicated compositions that additionally contain at least one additional substituent (C) that provides long term psychological feedback and/or at least one additional substituent (D) that provides short term psychological feedback;

15 wherein

the substituent (C) that provides the long term psychological feedback is selected from the group consisting of:

20 an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine; theophylline; theobromine; California poppy; calcium; chromium picolinate; chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana (*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine; GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine; pseudoepinephrine; pyridoxal-5-phosphate; serotonin; sucrose; fructose;

25 glucose; high fructose corn syrup; red rice yeast; and St. Johnswort; and is present in an amount sufficient to provide a long term feeling of well-being or calmness; and

30 the substituent (D) that provides the short term psychological feedback is selected from the group consisting of:

an anandamide; an alcohol enhancer; angelica root; balm; bitter orange (*Aurantii pericarpium*); bogbean; boldo; calamus; California poppy; capsicum; caraway; cayenne; chamomile; cinchona bark; quinine;

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chocolate; cinnamon; clove; cocoa; condurango; dandelion; elecampane;
GABA; gentian; ginger; ginseng; holy thistle; hops; horehound; dried lemon
peel (*Citri pericardium*); mugwort; unripe orange; peppermint; quassia; red
sage; rosemary; star anise; thyme; tumeric; wormwood; yarrow; and zinc;
5 and

is present in an amount sufficient to provide a short term sensation of warmth,
tingling, excitement, tranquility and well-being, or a distinctive, intense, bitter or
unusual taste.

The invention additionally provides a composition for human consumption,

10 comprising:

at least one nutritionally beneficial substituent, the substituent being present in an
amount sufficient to provide a nutritional benefit to the human recipient; and
at least one additional substituent (C) that provides long term psychological feedback
substituent or at least one additional substituent (D) that provides short term
15 psychological feedback;

wherein the substituent (C) that provides the long term psychological feedback is
selected from the group consisting of:

an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-
fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine;
20 theophylline; theobromine; California poppy; calcium; chromium picolinate;
chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana
(*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine;
GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca
virosa; L-tyrosine; lobelia; magneslum; maraba; protopine; pseudophedrine;
25 pseudoepinephrine; pyridoxal-5-phosphate; serotonin; sucrose; fructose;
glucose; high fructose corn syrup; red rice yeast; and St. Johnswort; and

is present in an amount sufficient to provide a long term feeling of well-
being or calmness; and

the substituent (D) that provides the short term psychological feedback is selected
30 from the group consisting of:

an anandamide; an alcohol enhancer; angelica root; balm; bitter orange
(*Aurantii pericarpium*); bogbean; boldo; calamus; California poppy;
capsaicum; caraway; cayenne; chamomile; cinchona bark; quinine;

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chocolate; cinnamon; clove; cocoa; condurango; dandelion; elecampane;
GABA; gentian; ginger; ginseng; holy thistle; hops; horehound; dried lemon
peel (*Citri pericardium*); mugwort; unripe orange; peppermint; quassia; red
sage; rosemary; star anise; thyme; tumeric; wormwood; yarrow; and zinc;
and

is present in an amount sufficient to provide a short term sensation of
warmth, tingling, excitement, tranquility and well-being, or a distinctive,
intense, bitter or unusual taste.

The invention additionally provides a method for providing a nutritionally beneficial
substituent (A) to a human, comprising administering or providing to the human a composition
containing:

the nutritionally beneficial substituent (A) in an amount sufficient to provide the
nutritional benefit to the human recipient; and
at least one additional substituent (C) that provides long term psychological feedback
substituent or at least one additional substituent (D) that provides short term
psychological feedback;
wherein the substituent (C) that provides the long term psychological feedback is
selected from the group consisting of:

an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-
fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine;
theophylline; theobromine; California poppy; calcium; chromium picolinate;
chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana
(*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine;
GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca
virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine;
pseudoepinephrine; pyridoxal-5-phosphate; serotonin; sucrose; fructose;
glucose; high fructose corn syrup; red rice yeast; and St. Johnswort; and
is present in an amount sufficient to provide a long term feeling of well-
being or calmness; and

the substituent (D) that provides the short term psychological feedback is selected
from the group consisting of:

an anandamide; an alcohol enhancer; angelica root; balm; bitter orange
(*Aurant pericarpium*); bogbean; boldo; calamus; California poppy;

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capsaicum; caraway; cayenne; chamomile; cinchona bark; quinine; chocolate; cinnamon; clove; cocoa; condurango; dandelion; elecampane; GABA; gentian; ginger; ginseng; holy thistle; hops; horehound; dried lemon peel (*Citri pericardium*); mugwort; unripe orange; peppermint; quassia; red sage; rosemary; star anise; thyme; turmeric; wormwood; yarrow; and zinc; and

is present in an amount sufficient to provide a short term sensation of warmth, tingling, excitement, tranquility and well-being, or a distinctive, intense, bitter or unusual taste.

The invention additionally provides an aqueous beverage composition for human consumption containing kudzu in liquid form, tryptophan or an analogue thereof, milk thistle, or bioactive zinc dissolved or suspended in water.

The invention also provides a composition for human consumption, comprising two, three, four or five nutritionally beneficial substituents (A) selected from the group consisting of

adrenochrome semicarbazone; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluoro-tryptophan; 6-fluorotryptophan; tryptophan; acetosalicylic acid; ibuprofen; acetaminophen; alfalfa; allocryptine; beta-carotene; calcium; caffeine; theophylline; theobromine; choline; chromium picolinate; chromium polynicotinate; diadzin; diadzein; damiana; turnera diffusa; dandelion; evening primrose oil; folic acid; GABA; ginger; ginkgo biloba; ginseng; glutathione; cysteine; L-glutamine; glycine; N-acetylcysteine; L-cysteine and L-methionine; S-adenosylmethionine; green tea; guarana; hops; inositol; iron; kava kava; kombucha tea; kudzu; lobelia; glutamic acid; D-phenylalanine; DL-phenylalanine; L-tyrosine; lecithin; linoleic acid; gamma-linoleic acid; magnesium; milk thistle extract (silymarin); niacin; PABA; protopine; puerarin; pyridoxal-5-phosphate; selenium; soluble fiber; St. Johnswort; taurine; sucrose; fructose; glucose; yellow dock; zinc and zinc picolinate; and zinc polynicotinate.

The invention also provides a composition for human consumption, comprising two, three, four or five nutritionally beneficial substituents (C) that provide long term psychological feedback, wherein said nutritionally beneficial substituents (C) are selected from the group consisting of:

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an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine; theophylline; theobromine; California poppy; calcium; chromium picolinate; chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana (*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine; GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine; pseudoepinephrine; pyridoxal-5-phosphate; red rice yeast; serotonin; sucrose; fructose; glucose; high fructose corn syrup; and St. Johnswort.

10 DETAILED DESCRIPTION OF THE INVENTION:

The invention relates to formulated, defined compositions having a nutritionally beneficial substituent and a long and/or short term substituent that stimulates psychological feedback, optionally in combination with a substituent that provides a traditional psychological feedback. The invention further relates to vehicles or devices that accomplish the delivery of the composition to a recipient. In a more preferred embodiment, the invention concerns such formulated, defined compositions that contain both a short term and a long term substituent that stimulates psychological feedback.

Some important conditions (e.g., alcohol and drug abuse, etc.) are experienced by individuals who may suffer from denial, and do not want to admit to the existence of a problem. By providing positive psychological feedbacks and multiple benefits common to the class, such individuals can be encouraged to improve their nutrition for some of the combination of nutritional benefits, without having to face their psychological problems, and thus, as an unintended consequence, be exposed to the proper nutrition for the long term solution to their major problems.

25 THE DELIVERY VEHICLES OR DEVICES OF THE INVENTION

The compositions of the present invention are formulated or included in vehicles or devices that accomplish their delivery to recipients, and in particular, to recipient humans. Vehicles suitable for oral or translingual delivery are particularly preferred. A translingual delivery vehicle is one that accomplishes the delivery of the composition via adsorption into the tongue, gums or soft tissues of the oral cavity. A vehicle suitable for oral delivery is one

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that accomplishes the delivery of the composition after ingestion. Oral and translingual/transdermal vehicles include beverages, lozenges, elixirs, syrups, powders, candies, chewable tablets, etc.

5 In an alternate embodiment, the delivery of the compositions of the present invention is accomplished using a transdermal delivery device. Such devices include bandages, patches, implants, etc. that accomplish the delivery of substituents via adsorption through the skin.

The compositions of the present invention are said to be "formulated, defined compositions" by which it is meant that at least two, and preferably all, of their chemical substituents are substantially defined chemically. Thus, although the compositions of the
10 present invention may contain undefined substituents, such as those found in naturally obtainable plant extracts, etc., in all instances they contain at least two chemically ascertainable substituents that were deliberately added to the composition in predetermined amounts to achieve preselected concentrations. Where appropriate, the amounts of such substituents in the compositions of the invention will preferably be determined with
15 consideration of the functional concentration (potency) of the substituent.

Beverages for oral administration are the preferred delivery vehicle. As used herein, the term "beverage" is intended to refer to a liquid composition that is in "single" strength form and is ready to drink. Examples of beverage compositions are well known (see, U.S. Patents 4,737,375 (Nakel *et al.*), 4, 992,282 (Mehansho *et al.*), 5,683,578 (Heckert *et al.*),
20 5,571,441 (Andon *et al.*), each herein incorporated by reference).

The invention contemplates the formulation and use of such beverages, as well as the formulation and use of beverage "concentrates." Such concentrates include solid materials (capsules, tablets, powders, etc.) or solutions, suspensions, or other liquids that require dilution before attaining their desired final state. Such liquid compositions may be formulated
25 from the dissolution or suspension of solid substituents, or from the mixing of liquid substituents, or both. The liquid compositions of the present invention are intended to be orally provided, as distinguished from intravenous or other means.

The beverages of the present invention may be imbibed cooled (as by a refrigerant), or at ambient or elevated temperature (i.e., from about 25 °C to about 180 °C) or at more elevated temperatures (i.e., as a "hot" drink). In a preferred embodiment, the beverages of
30 the present invention are imbibed at temperatures below 180 °C. In a more preferred embodiment, the beverages of the present invention are imbibed at temperatures below 25 °C.

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The beverages of the present invention are preferably alcohol-free. They thus contain less than about 10% ethanol, more preferably less than about 5% ethanol, and most preferably are alcohol-free (i.e. only a trace amount of ethanol or none at all). The term "alcohol-free," as used herein, is intended to be limited to consideration of the ethanol (ethyl alcohol) concentration of the beverage, and not to refer generally to concentrations of other non-ethanol alcohols that may be present. Alternatively, the beverages of the present invention may be alcohol-containing beverages (i.e., a beverage having between about 10% and about 40% alcohol).

The beverages of the present invention may be either carbonated or non-carbonated. The term "carbonated" means that the beverage contains both dissolved and dispersed carbon dioxide. Methods of forming carbonated beverages are well known in the art (see, for example, U.S. Patent 4,946,701 (Tsai *et al.*). Usually, when carbonated, the beverages of the present invention will contain from 1.0 to about 4.5 volumes of carbon dioxide. The preferred carbon dioxide beverages contain from about 2 to about 3.5 volumes of carbon dioxide.

THE COMPOSITIONS OF THE INVENTION

The compositions of the present invention contain at least one substituent selected from a first class of substituents that comprise nutritionally beneficial compounds. Any of a wide array of such substituents may be included in the compositions of the invention. For example, a beverage designed for individuals exhibiting the effects of alcohol, or the effects of mood altering prescription or non-prescription drugs (e.g., depressants, narcotics, hallucinogens, stimulants) may contain substituents that may replace depleted nutrients (such as vitamins, minerals, etc.); serve as antioxidants; improve or repair brain function (e.g., memory, learning, etc.); suppress appetite or alcohol desire; reverse alcohol-related damage; alleviate stress; improve virility; improve or repair liver function, improve or repair immune system responses, alleviate depression; improve or repair blood functions (e.g., oxygen transport, blood sugar level stabilizers, metabolite transport, detoxification, ion balance, etc.).

Substituents that accomplish such goals are well-known in the art. The compositions of the present invention contain at least one, and more preferably 2 or more substituents of this first class. Preferred substituents of this first class, their associated function, and their preferred concentrations in the compositions of the present invention are described in Table A. In Table A, where a substituent is indicated to have multiple associated functions, the same concentration of substituent provides all functions, unless a separate dosage is indicated. To

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be nutritionally beneficial, as used herein, a substituent is to be provided at a recited concentration, which is the preferred daily intake amount of the substituent. The daily intake amount may be obtained by a single serving, etc., or by multiple servings, etc.. In a preferred embodiment, the daily intake amount will be delivered in three servings, each comprising one third of the total preferred intake amount. In Table A, the amount/day shown is the most preferred amount per day, unless a maximum, more preferred and/or most preferred amount/day is indicated. Where no amount/day is provided, the substituent may be provided in any customary or traditional amount/day.

| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|---|-------|---|---------------------------------|-------------------|---|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| tryptophan analogue (5- hydroxytryptophan or equivalent compounds (e.g., 5- fluoro-A- methytryptamine, 5-fluorotryptophan, 6-fluorotryptophan, tryptophan, etc.) | mg | 5-18,000 | 51-3,468 | 357 | Alleviate Depression Blood Sugar Stabilizer Decrease Alcohol Desire Reduces Withdrawal Stresses Restores Deficit Associated With Alcohol |
| Acetylsalicylic Acid, Ibuprofen, Acetaminophen | mg | To Limit Of Non-Prescription Medication | | | Reduces Headache Pain Calming |
| Alfalfa | mg | 100-5,000 | 578-4,970 | 1,284 | Promote Blood Detoxification Promote Liver Repair Reverse Alcohol-Related Damage |
| Alloxyptine | mg | 0.1-50,400 | 5-1,800 | 170 | Reduce Reward Effect of Alcohol Relieves Withdrawal Symptoms from both Depressants and Stimulants |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|---|-------|-----------|---------------------------------|-------------------|--|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Adrenochrome Semicarbazone | mg | 1-986 | 21-187 | 98.4 | Psychological feedback Stimulant Euphoriant |
| Beta-Carotene | mg | 0.34-120 | 1.1-24.6 | 12.8 | Antioxidant Enhance Immune System Response |
| Calcium | mg | 10-4,000 | 567-2,980 | 1,222 | Alleviate Depression Improve Neurotransmitter function (serotonin and dopamine) Reduce Blood Pressure |
| Caffeine (including theophylline, theobromine and related methylxanthines) (amounts are total effective available amounts of caffeine in composition) | mg | 2-1000 | 65-723 | 322 | Discourage Alcohol Use Increase Alcohol Metabolism Inhibit Adenosine Uptake Stimulant |
| Choline | mg | 11-12,972 | 254-981 | 768 | Alleviate Stress Enhance Immune System Response Promote Brain Repair Promote Liver Repair |
| Chromium Cr-Picolinate Cr-Polynicotinate (Cr amounts increased with amount of Zn present, decreased for amounts of amino acids) | µg | 2-800 | 5-400 | 194 | Blood Sugar Stabilizer |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|-----------|---------------------------------|-------------------|--|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Diadzin | g | 0.001-62 | 3-46 | 12.24 | Suppress Alcohol Intoxication Decrease Alcohol Intake |
| Diadzein | g | 0.001-52 | 3-26 | 8.16 | Suppress Alcohol Intoxication Promote Decreased Alcohol Intake |
| Damiana Turnera Diffusa | Tbsp | 0.5-15 | 1-8 | 6 | Increase Alcohol Metabolism Inhibit Adenosine Uptake Mild Aphrodisiac Mild Euphoria Promote Decreased Alcohol Consumption Stimulant |
| Dandelion | mg | 0.01-100 | 3-66 | 44 | Blood Sugar Stabilizer Enhance Immune System Response Increase Fat Digestion Promote Liver Repair |
| Evening Primrose Oil | mg | 20-18,000 | 200-2,600 | 789 | Improve Cognitive Function Promote Blood Detoxification Promote Brain Repair Supplies gamma- Linolenic Acid Promote Liver Repair |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|------------|---------------------------------|-------------------|---|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Folic Acid | µg | 10-50,000 | 50-2,987 | 784 | Restores Alcohol- Associated Depletion of Folic Acid Alleviate Depression Enhance Immune System Response Promote Blood Detoxification Promote Brain Repair Suppress Alcohol Desire Suppress Appetite |
| GABA | g | 0.75-39 | 3.6-14.3 | 7.43 | Alleviate Stress Promote Brain Repair |
| Ginger | mg | 260-10,000 | 700-5,000 | 2,170 | Antioxidant Blood Sugar Stabilizer Aid Nausea Control |
| Ginkgo Biloba | mg | 0.5-1,200 | 20-460 | 129 | Alleviate Depression Antioxidant Brain Repair Decreases Alcohol- Induced Withdrawal Symptoms Decreases Alcohol- Induced Nerve Damage |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|---|-------|-----------|---------------------------------|-------------------|---|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Ginseng | g | 0.05-20 | 0.9-4.9 | 1.6 | Aids Mental Concentration Alleviate Stress Helps Adapting Immunostimulant Promote Brain Repair Promotes Feeling of Well-Being Stimulant |
| Glutathione or Glutathione equivalents (e.g., cysteine, L- glutamine, glycine) | mg | 51-993 | 101-1,288 | 223 | Alleviate Depression Improve Libido Impaired by Alcohol Remove Toxins and Free Radicals Repair Liver Restore Glutathione Depleted by Alcohol |
| Other Glutathione Equivalents: N-acetylcysteine (NAC), L-cysteine + L- methionine, S- adenosylmethionine (SAME) | mg | 110-9,934 | 1,042- 4,820 | 2,435 | Suppress Appetite Suppress Alcohol Desire |
| Green Tea | mg | 50-25,000 | 900-19,900 | 8,046 | Blood Sugar Stabilizer Delays Caffeine Stimulation Increases Alcohol Metabolism Reduces Blood Sugar |
| Guarana | g | 0.2-3.4 | 1.2-2.7 | 2.06 | Increases Alcohol Metabolism Reduces Blood Sugar Suppresses Alcohol Desire Stimulant |
| Hops | g | 0.001-6 | 0.178-3 | 0.9 | Brain Repair Calming |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|--------------------|------------|---------------------------------|-------------------|---|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Inositol | mg | 2-2,910 | 78-958 | 208 | Alleviate Stress Brain Repair Enhance Immune System Response Promote Liver Repair |
| Iron | mg | 1-77 | 4-39 | 22 | Enhance Cell Immunity Enhance Immune Function |
| Kava Kava | | | | | Induces Calming Relaxes Muscles |
| Kombucha Tea | ml | 101-13,500 | 1,134- 7,800 | 4,700 | Stimulant Organ Detoxification Slows or Reverses Aging Helps fight diseases (e.g., AIDS, cancer and multiple sclerosis) |
| Kudzu | g | 0.001-82 | 3-33 | 9.27 | Suppress Alcohol Desire Suppress Alcohol Intoxication |
| Lobelia | mg | 58-6,978 | 356-1,367 | 745 | Stimulate and Calms Decreases Desire for Alcohol Decreases Desire for Smoking |
| Cysteine | mg | 4-275 | 32-104 | 56 | Promote Blood Detoxification Promote Brain Repair Promote Liver Repair Protects Against Alcohol Toxins and Pollutants |
| Glutamic Acid | Taken as Glutamine | | | | Promote Brain Repair |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|------------|---------------------------------|-------------------|--|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Glutamine | mg | 111-8,891 | 556-4,808 | 2,746 | Blood Sugar Stabilizer Promote Calming Promote Liver Repair Reduce Withdrawal Stress Suppress Alcohol Desire Suppress Appetite Improve Mental Capabilities |
| L-Methionine | mg | 6-325 | 24-199 | 57 | Blood Detoxification Promote Brain Repair Increase Lecithin Production Promote Liver Repair Suppress Fat Buildup in Liver |
| D-Phenylalanine DL-Phenylalanine | g | 0.10-12 | 0.4-9 | 2.3 | Alleviate Depression Decrease Alcohol Desire Promote Neurotransmitter Function |
| L-Tyrosine | g | 0.001-8 | 0.50-3.9 | 2.6 | Promote Brain Repair |
| Lecithin | mg | 350-42,956 | 360-11,490 | 1,846 | Improve Immune System Response Reverse Alcohol- Induced Liver Damage Provides Choline, Inositol, and Linoleic Acid Suppress Cirrhosis and Fibrosis |
| Linoleic Acid | mg | 31-5,789 | 234-2,450 | 1,420 | Precursor to gamma- Linoleic Acid Brain Repair Liver Repair |
| gamma-Linoleic Acid | mg | 1.1-4,905 | 102-980 | 500 | Brain Repair Liver Repair |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|------------|---------------------------------|-------------------|--|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Magnesium | mg | 1-1,990 | 108-879 | 546 | Alleviate Depression Decreases Alcohol Consumption Restores Mg Deficit Associated with Alcohol Consumption Eases Withdrawal Symptoms of Hyperexcitability and Hallucination Mood Stabilization Reverse Alcohol-Related Damage |
| Milk Thistle Extract (Silymarin) | mg | 1-500 | 110-380 | 287 | Promote Liver Repair Suppress Liver Damage |
| Niacin | mg | 1-700 | 6-34 | 28 | Promote Blood Detoxification Promote Liver Repair |
| PABA | mg | 2-225 | 21-66 | 34 | Alleviate Depression |
| Protopine | mg | 0.1-50,400 | 5-1,800 | 170 | Reduce Reward Effect of Alcohol Calming Relieves Withdrawal Symptoms from both Depressants and Stimulants |
| Puerarin | g | 0.001-63 | 3-44 | 13.28 | Suppress Alcohol Intoxication Decrease Alcohol Intake |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|---------|---------------------------------|-------------------|---|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Pyridoxal-5- Phosphate | mg | 1-989 | 31-199 | 124 | Alleviate Depression Decreases Alcohol Desire Enables Neurotransmitter Functions Mood Stabilizer Enhances Immune Function |
| Red Rice Yeast | | | | | Mood Stabilizing; Calming |
| Selenium | µg | 2-2,500 | 20-340 | 44 | Antioxidant Enhances Immune Function Mood, Anxiety and Fatigue Stabilizer Promote Liver Repair Restores Deficit Associated with Alcohol Consumption Restore Immune Function |
| Soluble Fiber | | | | | |
| St. Johnswort | g | 0.4-11 | 1.2-6.9 | 3.2 | Elevate Mood Suppress Alcohol Desire Suppress Appetite |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|-----------|---------------------------------|-------------------|--|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Taurine | mg | 15-9,785 | 546-2,975 | 1,670 | Depressing Effect on Central Nervous System Reduces Affects of Stimulants Calming Restores Deficit Associated with Alcohol Helps with Utilization Problems Caused by Alcohol Helps Withdrawal for Cocaine and Similar Stimulants |
| Sucrose, Fructose, Glucose | | 6-30% | 7.5-17.4% | 10.11% | Discourage Use of Alcohol Enhance Alcohol Metabolism Inhibits Tryptophan Destruction |
| Vitamin A (retinol) | µg | 10-14,000 | 510-6,945 | 1,842 | Antioxidant Improve Immune System Response Promote Liver Protection and Repair |
| Vitamin B1 | mg | 0.01-400 | 1.01-9.9 | 4.7 | Antioxidant Promote Brain Repair (memory, thought, perceptions of reality) Promote Liver Repair Reverse Alcohol-Related Damage Reduce Alcohol-Related Deficit Reverse Motor Function and Eye Movement Impairment |
| Vitamin B3 | mg | 15 | | | Alleviate Stress |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|--|-------|-------------------|---------------------------------|-------------------|---|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Vitamin B5 | mg | 5-3,500 | 41-500 | 103 | Alleviate Stress Promote Brain Repair Promote Liver Repair |
| Vitamin B6 | mg | 0.01-200 | 0.8-4.8 | 1.45 | Mood Stabilization Enhance Immune System |
| Vitamin B12 | µg | 0.0025- 38,000 | 1-9,870 | 578 | Alleviate Depression Alleviate Stress Promote Brain Repair |
| Vitamin C | mg | 51-2,500 | 89-999 | 349 | Alleviate Stress Provide Antioxidant Promote Brain Repair Improve Immune System Promote Reversal of Alcohol-Related Damage |
| Vitamin D | µg | 1-446 | 4-65 | 12 | Improve Immune System Response Promote Liver Repair Promote Reversal of Alcohol-Related Damage |
| Vitamin E (tocopherals) | mg | 5-1,200 | 123-428 | 288 | Antioxidant Blood Sugar Stabilizer Promote Adsorption of Fat (liver support) Provide Immune System Support |
| Vitamin K | µg | 1-400 | 16-176 | 83 | Antioxidant Blood Sugar Stabilizer Kidney Support |

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| Table A Preferred Nutritionally Beneficial Substituents | | | | | |
|---|-------|----------|---------------------------------|-------------------|--|
| Substituent | Units | Maximum | Amount/Day More Preferred | Most Preferred | Associated Function(s) |
| Yellow Dock | mg | 50-6,000 | 250-999 | 743 | Improve Immune System Response Promote Blood Detoxification (jaundice) Promote Liver Repair |
| Zinc and Zinc Equivalents (e.g., zinc picolinate, zinc polynicotinate, etc.) | mg | 1-120 | 5-64 | 22 | Blood Sugar Stabilizer Improve DNA Synthesis Improve Immune System Response Increase Insulin Activity Increase Alcohol Metabolism Discourages Alcohol Use |

More Preferred Nutritionally Functional Substituents: In a more preferred embodiment, the compositions of the invention will contain one or more such preferred nutritionally beneficial substituents, such more preferred substituents being selected from the group consisting of: Adrenochrome Semicarbazone; 5-hydroxytryptophan or equivalent compounds (e.g.; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; etc.); Allocryptine; Choline; Diadzin; Diadzein; Damiana Turnera Diffusa; Evening Primrose Oil; Glutathione or Glutathione equivalents (e.g.; cysteine; L-glutamine; glycine); Other Glutathione Equivalents: N-acetylcysteine (NAC); L-cysteine + L-methionine; S-adenosylmethionine (SAME); Inositol; Kudzu; Lobelia; Cysteine; Glutamine; L-Methionine; Linoleic Acid; gamma-Linoleic Acid; Magnesium; Milk Thistle Extract (Silymarin); Niacin; PABA; Protopine; Puerarin; Pyridoxal-5-Phosphate; soluble fiber; St. Johnswort; Vitamin B1; Vitamin B5; Vitamin B12; Vitamin C; Vitamin D; Vitamin K; Yellow Dock; and Zinc and Zinc Equivalents (e.g.; zinc picolinate; zinc polynicotinate; etc.).

Highly Preferred Nutritionally Functional Substituents: In a still more preferred embodiment, the compositions of the invention will contain one or more such preferred nutritionally beneficial substituents, such highly preferred substituents being selected from the group consisting of: Adrenochrome Semicarbazone; 5-hydroxytryptophan or equivalent

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compounds (e.g.; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; etc.); Allocryptine; Diadzin; Diadzeln; Evening Primrose Oil; Other Glutathione Equivalents: N-acetylcysteine (NAC); L-cysteine + L-methionine; S-adenosylmethionine (SAME); Kudzu; Lobelia; Milk Thistle Extract (Silymarin); Niacin; Protopine; and Puerarin.

5 The compositions of the invention may contain at least one substituent selected from a second class of substituents that provide a traditional psychological feedback. Any of a wide array of such substituents may be included in the composition. Such substituents will impart a sensory psychological effect to the recipient, such as a pleasant taste, aroma, visual appeal, etc. The compositions of the invention may contain more than one such traditional
 10 psychological feedback substituent. Table B lists preferred traditional psychological feedback substituents that may be employed in the compositions of the present invention to impart such psychological effect.

| Table B Preferred Traditional Psychological Feedback Substituents | |
|--|---|
| Substituent | Concentration (amount/day) |
| Caffeine and caffeine equivalents (e.g., theophylline, theobromine, related methylxanthines) | To Limit Of Non-Prescription Medication |
| Green Tea Extract | |
| Carbonic Acid | |
| Phosphoric Acid | |
| Citric Acid | |
| Hoos | |
| Cola | |
| Cocoa | |
| Chocolate | |
| Anandamide | |
| Quinine | |
| Malic Acid | |

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| Table B Preferred Traditional Psychological Feedback Substituents | |
|--|-------------------------------|
| Substituent | Concentration (amount/day) |
| Sweetener (such as caloric sweeteners (e.g., fructose, high fructose corn syrup, sucrose, maltose, glucose, lactose, sorbitol, galactose, etc.) or substantially non-caloric sweeteners (e.g., aspartame (and its derivatives), saccharin, L-sugars, cyclamates, etc.) | |
| Fruit juice or juice extract such as non-citrus fruit juices or juice extracts (e.g., those obtainable from apple, pineapple, grape, pear, banana, plum, cherry, peach, etc.); berry fruit juices or juice extracts (such as those obtainable from strawberry, blueberry, cranberry, blackberry, etc.); or citrus fruit juices or juice extracts (such as those obtainable from orange, grapefruit, lemon, lime, etc.) | |
| Milk (including mammalian milk products such as skim milk and cream, and vegetable milks, such as soy milk) | |
| Vegetable juices or juice extracts (such as those obtainable from carrot, tomato, beets, celery, etc.) | |
| kudzu | |
| 5-hydroxy-tryptophan | |
| Spices and plant extract flavorings (such as cola, ginger, nutmeg, pepper, vanilla, chocolate, rum, mint, sugar maple, herbs, etc.). | |

Synthetically compounded flavorants or naturally isolated flavorants may be employed as such traditional psychological feedback substituents.

As indicated, the orally or translingually delivered compositions of the present invention may be formulated to contain green tea extract. Green tea helps to control the negative effects of caffeine. See, for example, French patent No. 2,586,532 issued to Balansard *et al.*

More Preferred Traditional Psychological Feedback Substituents: In a more preferred optional embodiment, the compositions of the present invention will contain one or more preferred traditional psychological feedback substituents, such more preferred substituents being selected from the group consisting of: Caffeine and caffeine equivalents (e.g.; theophylline; theobromine; related methylxanthines); cola; carbonic acid; phosphoric acid; citric acid; hops; cocoa; chocolate; anandamide; quinine; malic acid; non-citric fruit juice or juice extract (such as wherein the fruit is grape; apple; cranberry; cherry; peach; etc.); milk;

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vegetable juice or juice extract (such as wherein the vegetable is carrot; celery; etc.); kudzu; and 5-hydroxy-tryptophan.

Highly Preferred Traditional Psychological Feedback Substituents: In a still more preferred embodiment, the compositions of the present invention will contain one or more highly preferred traditional psychological feedback substituents, such highly preferred substituents being selected from the group consisting of: Caffeine and caffeine equivalents (e.g.; theophylline; theobromine; related methylxanthines) at a concentration/day of greater than about 65 mg; carbonic acid; phosphoric acid; hops; non-citric fruit juice or fruit juice extract (such as wherein the fruit is grape; apple; cranberry; cherry; peach; etc.); milk; vegetable juice or juice extract (such as wherein the vegetable is carrot; celery; etc.); kudzu; and 5-hydroxy-tryptophan.

The compositions of the invention may contain at least one substituent selected from a third class of substituents that provide long term psychological feedback. Any of a wide array of such substituents may be included in the composition. Such substituents will impart a long term psychological effect to the recipient, such as a feeling of warmth or tingling, of excitement, of tranquillity and well-being, etc. In a preferred embodiment, the compositions of the invention will contain more than one such long term psychologically active substituent. Table C lists particularly preferred long term duration psychological feedback substituents that may be employed in the compositions of the present invention to impart a long term psychological effect.

| Table C Preferred Long Term Psychological Feedback Substituents | | | | | |
|--|-------|----------------------------|----------------|----------------|--|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Anandamide | mg | 31-296,000 | 1,013-144,600 | 7,083 | Psychological Feedback Warm feeling Euphoria |

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| Table C Preferred Long Term Psychological Feedback Substituents | | | | | |
|---|---------|----------------------------|----------------|----------------|---|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| 5-hydroxytryptophan or equivalent compounds (e.g., 5-fluoro- Δ -methyltryptamine, 5-fluorotryptophan, 6-fluorotryptophan, tryptophan, etc.) | mg | 5-18,000 | 60-3,468 | 357 | Decrease Alcohol Desire Mood Stabilization Increases Brain Serotonin Reduces Withdrawal Stresses Restores Deficit Associated With Alcohol |
| Alloxyptine | mg | 0.1-50,400 | 5-1,800 | 170 | Reduce Reward Effect of Alcohol Calming Relieves Withdrawal Symptoms from both Depressants and Stimulants |
| Caffeine (including theophylline, theobromine and related methylxanthines) (amounts are total effective available amounts of caffeine in composition) | mg | 2-1000 | 36-723 | 322 | Discourage Alcohol Use Increase Alcohol Metabolism Inhibit Adenosine Uptake Stimulant |
| California Poppy | mg | 0.1-50,400 | 5-1,800 | 170 | Reduce Reward Effect of Alcohol Calming Relieves Withdrawal Symptoms from both Depressants and Stimulants |
| Calcium | mg | 10-4,000 | 567-2,980 | 1,222 | Alleviate Depression |
| Chromium Cr-Picolinate Cr-Polynicotinate (Cr amounts increased with amount of Zn present, decreased for amounts of amino acids) | μ g | 2-800 | 5-400 | 194 | Increases Tryptophan Blood/Brain Barrier Transport |

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| Table C Preferred Long Term Psychological Feedback Substituents | | | | | |
|--|-------|----------------------------|----------------|----------------|---|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Chicalote Extract (without toxic substituents) | µg | 2-800 | 5-400 | 194 | Reduce Reward Effect of Alcohol Calming Relieves Withdrawal Symptoms from both Depressants and Stimulants |
| Cocoa | mg | 31-300,000 | 1,013-145,000 | 7,083 | Activates Cannabinoid Receptors Warm Feeling Euphoria |
| Chocolate | mg | 31-300,000 | 1,013-145,000 | 7,083 | Activates Cannabinoid Receptors Warm Feeling Euphoria |
| Damiana (<i>Turnera diffusa</i>) | Tbsp. | 0.5-15 | 1-8 | 6 | Mild Aphrodisiac Mild Euphoria (1-1.5 hours) Decrease Alcohol Desire |
| DL-phenylalanine | g | 0.01-12 g | 0.4-9 g | 2.3 g | Psychological feedback Mood Stabilization Decrease Sugar Desire Decrease Alcohol Desire Decrease Chronic Pain |
| Ephedra (especially nevadensis) | mg | 6-8,000 | 61-2,990 | 376 | Stimulant Decrease Alcohol Desire |
| Ephedrine | mg | 0.9-390 | 6-149 | 23.6 | Stimulant Decrease Alcohol Desire |
| Epinephrine | | | | Legal Amounts | Stimulant |
| GABA | g | 0.75-39 | 3.6-14.3 | 7.43 | Promote Calmness Tingling Sensation on Skin |

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| Table C Preferred Long Term Psychological Feedback Substituents | | | | | |
|--|-------|----------------------------|-------------------|-------------------|---|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Ginger | g | 0.026-10 | 0.55-5 | 2.17 | Antioxidant Blood Sugar Stabilizer Controls Nausea Stimulate Appetite Aromatic Smell Flush, Rosy Complexion |
| Ginseng | g | 0.05-20 | 0.9-4.9 | 1.5 | Stimulant Enhances Mental Concentration Energizes |
| L-glutamine | mg | 111-8,891 | 556-4,808 | 2,746 | Blood Sugar Stabilizer Promote Calmness Reduces Stress of Alcohol Withdrawal Suppress Alcohol Desire Suppress Appetite |
| Green Tea | g | 0.05-25 | 0.9-19 | 8.80 | Promote Calmness and Relaxation Decreases Alcohol in Blood Delays Caffeine Stimulation Blood Sugar Stabilizer |
| Guarana | g | 0.2-3.4 | 1.2-2.7 | 2.06 | Increases Alcohol Metabolism Reduces Blood Sugar Suppresses Alcohol Desire |
| Kava Kava | | | | | Relaxes Muscles Calming |
| Lactuca Virosa | µg | 0.01-10,000 | 1.4-4,569 | 234 | Calming Contains Trace Amounts of Morphine |
| L-tyrosine | g | 0.001-8 | 0.05-3.9 | 2.6 | Psychological feedback Neurotransmitter (L- dopa) precursor |

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| Table C Preferred Long Term Psychological Feedback Substituents | | | | | |
|--|-------|----------------------------------|----------------|-----------------------------|---|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Lobelia | mg | 58-6,978 | 356-1,367 | 745 | Psychological feedback Decreases Desire for Alcohol |
| Maraba | | | | | |
| Magnesium | mg | 1-1,990 | 108-879 | 546 | Decrease Alcohol Consumption Restore Deficit Associated with Alcohol Consumption Eases Withdrawal Symptoms of Hyperexcitability and Hallucination Mood Stabilization |
| Protopine | mg | 0.1-50,400 | 5-1,800 | 170 | Reduce Reward of Alcohol Calming Relieves Withdrawal Symptoms for both Depressants and Stimulants |
| Pseudophedrine | mg | 0.01-79 | 0.09-24 | 9.8 or maximum legal amount | Stimulant Decrease Alcohol Desire |
| Pseudoepinephrine | mg | | | maximum legal amount | Stimulant Decrease Alcohol Desire |
| Pyridoxal-5-phosphate | mg | 1-989 | 31-199 | 124 | Decreases Alcohol Desire Alleviate Depression Enable Neurotransmitters Mood Stabilization |
| Red Rice Yeast | | | | | Mood Stabilization Calming |
| Serotonin / Enkephaline | | (However generated in the Brain) | | | Psychological feedback |

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| Table C Preferred Long Term Psychological Feedback Substituents | | | | | |
|--|-------|----------------------------|----------------|----------------|--|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Sucrose, Fructose, Glucose, High Fructose Corn Syrup | | 1.5-30% | 7.5-17.4% | 10.11% | Discourage use of alcohol Decreases Duration of Alcohol Action Inhibits Tryptophan Destruction |
| St. Johnswort | g | 0.4-11 | 1.2-6.9 | 3.2 | Suppress Appetite Feels Good Monamine Oxidase Inhibitor Eases Withdrawal Suppress alcohol Desire |
| Vitamin B6 | mg | 0.01-200 | 0.8-49.8 | 1.45 | Mood Stabilization Immune System Support |

More Preferred Long Term Psychological Feedback Substituents: In a preferred embodiment, the compositions of the present invention will contain one or more such long term psychological feedback substituents, such more preferred substituents being selected from the group consisting of: 5-hydroxytryptophan or equivalent compounds (e.g.; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; etc.); Allocryptine; California Poppy; Chromium (Cr-Picolinate; Cr-Polynicotinate; (Cr amounts increased with amount of Zn present; decreased for amounts of amino acids)); Cocoa; Damiana (*Turnera diffusa*); D-phenylalanine; Ephedra (especially nevadensis); Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoephedrine; Pyridoxal-5-phosphate; Red Rice Yeast; Serotonin; St. Johnswort; and Vitamin B6.

Highly Preferred Long Term Psychological Feedback Substituents: In a still more preferred embodiment, the compositions of the present invention will contain one or more such long term psychological feedback substituents, such highly preferred substituents being selected from the group consisting of: 5-hydroxytryptophan or equivalent compounds (e.g.; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; etc.); Allocryptine; California Poppy; Chicalote Extract (without toxic substituents); Cocoa; Damiana

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(Turnera diffusa); Ephedra nevadensis; Ephedrine; Green Tea; Lactuca Virosa; Lobelia; Maraba; Protopine; Pseudophedrine; Pseudoephedrine and Red Rice Yeast.

The compositions of the invention may contain at least one substituent selected from a fourth class of substituents that provide short term psychological feedback. Any of a wide array of such substituents may be included in the composition. Such substituents will impart a short term psychological effect to the recipient, such as a feeling of warmth or tingling, of excitement, of tranquillity and well-being, etc. In a preferred embodiment, the compositions of the invention will contain more than one such short term psychologically active substituent.

In a particularly preferred embodiment, the compositions of the invention may contain psychologically active substituents that mediate their respective effects in both a short duration (i.e., effect completed within 15 minutes of nutritionally beneficial.) and a long term duration (i.e., effect completed after 15 minutes of nutritionally beneficial). Table D lists preferred short term duration psychological feedback substituents that may be employed in the compositions of the present invention to impart a short term psychological effect.

| Table D Preferred Short Term Psychological Feedback Substituents | | | | | |
|---|-------|--|----------------|----------------|--|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Anandamide | mg | 31-296,000 | 1,013-145,000 | 7,083 | Warm feeling Euphoria |
| Alcohol Enhancers, Standard Flavorants | | Between just noticeable and disagreeable | | | Imitate Burning and Biting Sensations of Alcohol |
| Angelica root | | | | | Bitter Aromatic Initially Intensely Spicy Turns Lastingly Pungent Stimulates Appetite |
| Balm | | | | | Calm Pleasantly Spicy Taste |
| Bitter orange (<i>Aurantia pericarpium</i>) | | | | | Stimulate Appetite Pleasantly Spicy Taste |

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| Table D Preferred Short Term Psychological Feedback Substituents | | | | | |
|---|-------|----------------------------|----------------|----------------|---|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Bogbean | | | | | Stimulate Appetite Stimulate Gastric Acid |
| Soldo | | | | | Weak Hypnotic Pungently Spicy, Bitter Taste |
| Calamus | | | | | Somewhat Spicy Calming |
| California Poppy | mg | 0.1-50,400 | 5-1,800 | 170 | Euphoriant Reduce Reward Effect of Alcohol |
| Capsaicum | | 0.001-1.0% | 0.01-0.6% | 0.025% | Warming Sensation in Throat and Mouth |
| Caraway | | | | | Stimulate Appetite Relieves Flatulence Caused by Carbonation Solv Taste |
| Cayenne | | 0.001-1% | 0.01-0.6% | 0.025% | Warming Sensation in Throat and Mouth |
| Chamomile | | | | | Stimulate Appetite Aromatic Taste |
| Cinchona bark (quinine) | | | | | Astringent Taste Stimulate Appetite |
| Chocolate | mg | 31-296,000 | 1,013-157,000 | 7,087 | Psychological feedback Warm feeling Euphoria |
| Cinnamon | | | | | Stimulate Appetite Pungently Sweet Sweep, Sharp Taste Relieves Flatulence Associated with Carbonation |

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| Table D Preferred Short Term Psychological Feedback Substituents | | | | | |
|---|-------|----------------------------|----------------|----------------|---|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Clove | | | | | Stimulate Appetite Pungently Sweet Relieves Flatulence Associated with Carbonation |
| Cocoa | | | | | Psychological Feedback Warm Feeling Euphoria |
| Condurango | | | | | Stimulate Appetite Bitter Taste |
| Dandelion | | | | | Slight Bitter Taste Stimulate Appetite |
| Elecampane | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation |
| GABA | g | 0.75-39 | 3.6-14.3 | 7.43 | Tingling Sensation on Skin After Taking Orally |
| Gentian | | | | | Sweet Taste Changing to Intensely Bitter Stimulate Appetite |
| Ginger | g | 0.26-10 | 0.7-5 | 2.17 | Flush, rosy complexion Stimulate Appetite Aromatic Smell |
| Ginseng | g | 0.5-20 | 1.1-2.9 | 1.6 | Clean Taste Energetic feeling |
| Holy thistle | | | | | Stimulate Appetite Bitter Taste |
| Hops | mg | 1-6,000 | 178-2,990 | 934 | Calming Stimulate Appetite Aids Withdrawal |

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| Table D | | | | | |
|--|-------|----------------------------|----------------|----------------|---|
| Preferred Short Term Psychological Feedback Substituents | | | | | |
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Horehound | | | | | Bitter Taste Calming |
| Lemon Peel, dried (<i>Citri pericardium</i>) | | | | | Stimulate Appetite Spicy, Acidic Taste |
| Mugwort | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation Spicy Taste |
| Orange (unripe) | | | | | Stimulate Appetite Bitter Aromatic |
| Peppermint | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation Calming |
| Quassia | | | | | Stimulate Appetite Intensely Bitter |
| Red sage | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation Spicy and Bitter Taste |
| Rosemary | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation Pungent Taste |
| Star Anise | | | | | Stimulate Appetite Pungent and Spicy |
| Thyme | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation Pungent Taste |

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| Table D Preferred Short Term Psychological Feedback Substituents | | | | | |
|---|-------|----------------------------|----------------|----------------|--|
| Substituent | Units | Concentration (amount/day) | | | Associated Function(s) |
| | | Maximum | More Preferred | Most Preferred | |
| Tumeric | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation Pungent Bitter Taste |
| Vitamin K | µg | 12-1,950 | 80-990 | 426 | Feeling of Warmth from Accumulated Mega-amounts |
| Wormwood | | | | | Stimulate Appetite Bitter Aromatic, Intense Taste Strongly Relieves Flatulence associated with Carbonation |
| Yarrow | | | | | Stimulate Appetite Relieves Flatulence Associated with Carbonation |
| Zinc and zinc picollinate or polynicotinate equivalents | | 1-120 mg | 5-64 mg | 22 mg | Energetic feeling |

More Preferred Short Term Psychological Feedback Substituents: In a more preferred embodiment, the compositions of the present invention will contain one or more preferred short term psychological feedback substituents, such more preferred substituents being selected from the group consisting of: Anandamide; Alcohol Enhancers, Standard Flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Tumeric; Vitamin K; and Wormwood.

Highly Preferred Short Term Psychological Feedback Substituents: In a still more preferred embodiment, the compositions of the present invention will contain one or more highly preferred short term psychological feedback substituents, such highly preferred substituents being selected from the group consisting of: an anandamide; an alcohol

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enhancer; Angelica root; Boldo; California Poppy; Capsaicum; GABA; Gentian; Turmeric; Vitamin K; and Wormwood.

As indicated above, the invention specifically contemplates compositions containing one or more substituents of substituent classes: (A) that provide nutritional benefit, (B) that provide traditional psychological feedback, (C) that provide long term psychological feedback, and/or (D) that provide short term psychological feedback. Thus, the invention specifically contemplates compositions containing at least one substituent of each of the substituent classes: (A), (B), (C) and (D); (A), (B) and (C); (A), (B) and (D); (A), (C) and (D); (B), (C) and (D); (A) and (B); (A) and (C); (A) and (D); (B) and (C); (B) and (D); and (C) and (D).

The invention further contemplates compositions containing more than one substituent of each of the following substituent classes: (A), (B), (C) and (D); (A), (B) and (C); (A), (B) and (D); (A), (C) and (D); (B), (C) and (D); (A) and (B); (A) and (C); (A) and (D); (B) and (C); (B) and (D); (C) and (D); (A); (B); (C); and (D).

The invention thus specifically contemplates compositions containing: one or more of the above-recited preferred nutritionally beneficial substituents (A), one or more of the above-recited preferred long term psychological feedback substituents (C), and one or more of the above-recited preferred short term psychological feedback substituents (D).

The invention additionally contemplates preferred compositions containing either one or more of the above-recited more preferred nutritionally beneficial substituents (A) or one or more of the above-recited highly preferred nutritionally beneficial substituents (A), and one or more of the above-recited preferred long term psychological feedback substituents (B), and one or more of the above-recited preferred short term psychological feedback substituents (C).

The invention additionally contemplates preferred compositions containing one or more of the above-recited preferred nutritionally beneficial substituents (A), and one or more of the above-recited preferred long term psychological feedback substituents (C), and either one or more of the above-recited more preferred short term psychological feedback substituents (D) or one or more of the above-recited highly preferred short term psychological feedback substituents (D).

The invention additionally contemplates preferred compositions containing one or more of the above-recited preferred nutritionally beneficial substituents (A), and either one or more of the above-recited more preferred long term psychological feedback substituents (C) or one or more of the above-recited highly preferred long term psychological feedback

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substituents (C), and one or more of the above-recited preferred short term psychological feedback substituents (D).

5 The invention further contemplates more preferred compositions containing one or more of the above-recited more preferred nutritionally beneficial substituents (A), and one or more of the above-recited preferred long term psychological feedback substituents (C), and one or more of the above-recited more preferred short term psychological feedback substituents (D).

10 The invention further contemplates more preferred compositions containing one or more of the above-recited preferred nutritionally beneficial substituents (A), and one or more of the above-recited more preferred long term psychological feedback substituents (C), and one or more of the above-recited more preferred short term psychological feedback substituents (D).

15 The invention further contemplates highly preferred compositions containing one or more of the above-recited highly preferred nutritionally beneficial substituents (A), and one or more of the above-recited preferred long term psychological feedback substituents (C), and one or more of the above-recited highly preferred short term psychological feedback substituents (D).

20 The invention further contemplates highly preferred compositions containing one or more of the above-recited highly preferred nutritionally beneficial substituents (A), and one or more of the above-recited highly preferred long term psychological feedback substituents (C), and one or more of the above-recited preferred short term psychological feedback substituents (D).

25 The invention further contemplates highly preferred compositions containing one or more of the above-recited preferred nutritionally beneficial substituents (A), and one or more of the above-recited highly preferred long term psychological feedback substituents (C), and one or more of the above-recited highly preferred short term psychological feedback substituents (D).

30 The invention further contemplates very highly preferred compositions containing one or more of the above-recited highly preferred nutritionally beneficial substituents (A), and one or more of the above-recited highly preferred long term psychological feedback substituents (C), and one or more of the above-recited highly preferred short term psychological feedback substituents (D).

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5 The invention further contemplates compositions containing two, three, four or more of the above-recited preferred nutritionally beneficial substituents (A), and more preferably two, three, four or more of the above-recited highly preferred nutritionally beneficial substituents (A), and most preferably two, three, four or more of the above-recited highly preferred nutritionally beneficial substituents (A).

In all such compositions, traditional psychological feedback substituents (B) may be present.

10 In accordance with the invention, the compositions of the present invention may additionally contain non-pharmacological agents such as stomach acid buffering compounds, antacids, fiber, laxatives, muscle relaxants, analgesics, acetaminophens, ibuprophens, topical antibiotics, anti-inflammatory agents, etc.) at non-prescription levels. In yet another embodiment, the compositions of the invention may be formulated to contain prescription pharmacological agents, such as hormones (e.g., insulin, thyroid hormone, etc.), anti-inflammatory agents, hypertensives, anti-arrhythmias, etc. The co-administration of the compositions of the present invention and such prescription pharmacological agents has the salutary effect of confirming or the consumer's perception or recollection that a dosage has been consumed or administered, and as such aids in preventing overdosing and underdosing by individuals who are self administering such pharmacological agents.

15 As stated above, in a particularly preferred embodiment, the compositions of the present invention are provided via vehicles for oral or translingual delivery.

20 In a preferred embodiment, such vehicles are formulated to contain one or more additional substituents selected from the group consisting of: a xanthine alkaloid (such as a methylxanthine (caffeine, theophylline, theobromine, etc.) obtainable synthetically, or by extraction of plants (e.g. coffee beans, cola nuts, tea plants, etc.); carbonic acid, milk, vegetable juice, fruit juice, phosphoric acid, citric acid, hops, cocoa, chocolate, anandamide, quinine and malic acid.

25 The amounts of methylxanthines (and especially caffeine) present in the compositions of the invention are designed to result in the delivery of an amount of such methylxanthines sufficient to impart the desired effect. Thus, where the composition contain compounds that interact (or sequester) such methylxanthines, proportionately larger amounts of methylxanthine will be included in the composition. Likewise, where the composition contain substituents that enhance the desired effect of a methylxanthine, the amount of the methylxanthine in the composition will be proportionately reduced.

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Serotonin, and its precursors, and substituents that stimulate serotonin production and/or release are also preferred substituents of the compositions of the present invention.

The orally or translingually delivered compositions of the present invention may comprise clear solutions, or may be suspensions of particulate material (such as plant pulp or other tissue). When provided as a beverage, such beverages are typically free-flowing and have a viscosity similar to that of water. Preferably, thickening agents are added to impart greater viscosity to the beverages. The beverages of the present invention are typically dispensed and stored in containers (e.g., cardboard containers, glass or plastic bottles, metal cans, etc.).

10 **USES OF THE COMPOSITIONS OF THE INVENTION**

The compositions of the present invention provide a nutritionally beneficial substituent to an individual in a manner accompanied by a reinforcing psychological feedback sensation. The psychological feedback sensation imparts an immediate physiological recognition of the composition (such as a feeling of warmth, or a flush feeling) as well as a long term psychological feedback (such as a counter-depressive effect or a sense of well-being). These

15 feedbacks become psychologically associated with the nutritional benefit and the therapeutic activity of the composition and increase an individual's desire to take or use the composition on a regular basis, and thus serve to ensure that the individual obtains a nutritionally beneficial amount of the composition.

20 By the selected inclusion of desired substituents, the compositions of the present invention can be tailored to provide any of a number of desired therapeutic effects. Such effects include blood detoxification; liver repair and detoxification; lessening of a desire to drink alcohol; reversal of alcohol-induced damage; antioxidant activity; alleviating depression, alleviating stress, restoring or improving brain function (such as memory and learning

25 capabilities); suppressing appetite; stabilizing blood sugar levels; improving immune system function and response; etc.

Alternatively, or more preferably, in addition, such compositions can be formulated to contain effective amounts of nutritionally active substituents (such as vitamins, minerals, co-factors, etc.) which build or restore supplies of such substituents damaged by conditions

30 commonly related to each therapy so as to improve the general health of the recipient.

In a preferred embodiment, the compositions of the present invention are formulated to provide a treatment for the conditions associated with alcoholism and/or the effects of

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mood altering prescription or non-prescription drugs (e.g., depressants, narcotics, hallucinogens, stimulants, etc.). Such compositions, especially beverages are formulated to provide effective amounts of: (1) a liver function repairant (such as alfalfa, choline, dandelion, gotu kola, inositol, L-cysteine, L-methionine, lecithin, milk thistle, niacin, selenium, vitamin B1, vitamin D, yellow dock, zinc and or zinc picolinate); (2) a substituent for reversing alcohol-related damage (alfalfa, magnesium, vitamin B1, vitamin D); (3) a substituent for alleviating stress or depression (such as calcium, choline, folic acid, GABA, ginkgo biloba, ginseng, gotu kola, inositol, DL-phenylalanine, 5-hydroxy-tryptophan, lecithin, magnesium, PABA, vitamin B3, vitamin B5, vitamin B12, vitamin C); and (4) a substituent for reducing the recipient's desire for alcohol (such as daldzin, folic acid, glutathione, kudzu, L-glutamine, L-methionine, St. Johnswort).

Having now generally described the invention, the same will be more readily understood through reference to the following example which is provided by way of illustration, and is not intended to be limiting of the present invention.

Example 1 Sample Formula

In accordance with the teachings of the present invention, a beverage composition is prepared containing:

| | | |
|----|--|----------------|
| 20 | Glutamine | 3 g |
| | Milk Thistle Seed Extract | 2 ml |
| | St. Johnswort Buds Extract | 1.5 g |
| | Vitamin C | 1.5 g |
| | Vitamin B ₁ , B ₂ , B ₃ , B ₅ , B ₆ , B ₁₂ | 100 mg of each |
| 25 | Kudzu | 3 mg (daldzin) |
| | Selenium | 0.1 mg |
| | Zinc | 50 mg |
| | 5-Hydroxy Tryptophan | 150 mg |
| | Ephedra | 375 mg |
| 30 | Natural Alcohol Enhancer | 0.01% |
| | Water (sweetened) | |
| | Sodium Benzoate | preservative |

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The Ingredients were obtained as follows: Glutamine (Twinlab Mega Glutamine); Milk Thistle Seed Extract (Gaia 1:1 (80% alcohol)); St. Johnswort Buds Extract (Gaia 1:1 (80% alcohol)); Vitamin C (Twinlab C-1000 crystalline); Vitamin B (Twinlab B-1-group); Kudzu (Nature's Herbs, 1 mg daidzin, 556 mg cap); Selenium (Solaray 100 mcg); Zinc (Twinlab, Zn gluconate, honey and sweetened); 5-Hydroxy Tryptophan (extract Solaray 100 mg & St. Johnswort); Ephedra (Solaray 375 mg); Natural Alcohol Enhancer (Quest DY08312 (capsaicum, ginger, colatile smells); Water (plain carbonated, sweetened to contain 9.2% sugar).

All ingredients except Natural Alcohol Enhancer and main liquid with carbonation are dissolved in water sufficient to hold them all in solution. After being vacuum filtered to remove solids, the Natural Alcohol Enhancer and main liquid with carbonation are added. The resulting beverage composition is clear, and has a light yellow color. The beverage has a light licorice flavor similar to the flavor of dilute Galiano liqueur. The beverage has the flavor of a soft drink, but maintains a bite and nose suggestive of an alcoholic drink. The mild flavor of the beverage can be masked, if desired, with other flavorants. The beverage has a satisfactory shelf-life.

While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modifications and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice within the art to which the inventions pertains and as may be applied to the essential features hereinbefore set forth and as follows in the scope of the appended claims.

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WHAT IS CLAIMED IS:

1. A composition for human consumption, comprising:

at least one nutritionally beneficial substituent (A) selected from the group consisting of:

5 Adrenochrome Semicarbazone; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluoro-tryptophan; 6-fluorotryptophan; tryptophan; acetosalicylic acid; ibuprophen; acetaminophen; alfalfa; allocryptine; beta-carotene; calcium; caffeine; theophylline; theobromine; choline; chromium picolinate; chromium polynicotinate; 10 diadzin; diadzein; damiana; turnera diffusa; dandelion; evening primrose oil; folic acid; GABA; ginger; ginkgo biloba; ginseng; glutathione; cysteine; L-glutamine; glycine; N-acetylcysteine; L-cysteine and L-methionine; S-adenosylmethionine; green tea; guarana; hops; inositol; iron; kava kava; kombucha tea; kudzu; 15 lobelia; glutamic acid; D-phenylalanine; DL-phenylalanine; L-tyrosine; lecithin; linoleic acid; gamma-linoleic acid; magnesium; milk thistle extract (silymarin); niacin; PABA; protopine; puerarin; pyridoxal-5-phosphate; selenium; soluble fiber; St. Johnswort; taurine; sucrose; fructose; glucose; yellow dock; zinc and zinc picolinate; and zinc 20 polynicotinate;

and

at least one additional substituent (B) that provides traditional psychological feedback selected from the group consisting of:

25 caffeine or a caffeine equivalent; tryptophan; ephedra; cola; green tea extract; carbonic acid; phosphoric acid; citric acid; hops; cocoa; chocolate; an anandamide; quinine; malic acid; a sweetener; a fruit juice or fruit juice extract; milk; a vegetable juice or vegetable juice extract; kudzu and 5-hydroxy-tryptophan;

30 said substituent being present in an amount sufficient to provide a sensory psychological feedback.

2. The composition of claim 1, wherein said composition is a beverage.

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3. The beverage of claim 2, wherein beverage is substantially alcohol-free.
4. The compositions of any of claims 1-3 which additionally contain at least one additional substituent (C) that provides long term psychological feedback or at least one additional substituent (D) that provides short term psychological feedback;
- 5 wherein

said substituent (C) that provides said long term psychological feedback is selected from the group consisting of:

an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine; theophylline; theobromine; California poppy; calcium; chromium picolinate; chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana (*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine; GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine; pseudoephedrine; pyridoxal-5-phosphate; serotonin; sucrose; fructose; glucose; high fructose corn syrup; red rice yeast; and St. Johnswort;

and

said substituent (D) that provides said short term psychological feedback is selected from the group consisting of:

an anandamide; an alcohol enhancer; angelica root; balm; bitter orange (*Auranti pericarpium*); bogbean; boldo; calamus; California poppy; capsicum; caraway; cayenne; chamomile; cinchona bark; quinine; chocolate; cinnamon; clove; cocoa; condurango; dandelion; elecampane; GABA; gentian; ginger; ginseng; holy thistle; hops; horehound; dried lemon peel (*Citri pericardium*); mugwort; unripe orange; peppermint; quassia; red sage; rosemary; star anise; thyme; tumeric; wormwood; yarrow; and zinc;

and provides a short term sensation of warmth, tingling, excitement, tranquility and well-being, or a distinctive, intense, bitter or unusual taste.

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5. The composition of claim 4, wherein said composition contains at least one of said substituent (C) that provides said long term psychological feedback.
6. The composition of claim 4, wherein said composition contains at least one of said substituent (D) that provides said short term psychological feedback
7. The composition of claim 4, wherein said composition contains both at least one of said substituent (C) that provides said long term psychological feedback, and at least one of said substituent (D) that provides said short term psychological feedback.
8. The composition of any of claims 1-3, wherein said nutritionally beneficial substituent (A) of said composition is selected from the group consisting of:
Adrenochrome Semicarbazone; 5-hydroxytryptophan or an equivalent compound; allocryptine; choline; diadzin; diadzein; damiana (*Turnera diffusa*); evening primrose oil; glutathione or a glutathione equivalent; inositol; kudzu; lobelia; cysteine; glutamine; L-methionine; linoleic acid; gamma-linoleic acid; magnesium; milk thistle extract (silymarin); niacin; PABA; protopine; puerarin; pyridoxal-5-phosphate; St. Johnswort; yellow dock; and zinc.
9. The composition of claim 4, wherein said nutritionally beneficial substituent (A) of said composition is selected from the group consisting of:
Adrenochrome Semicarbazone; 5-hydroxytryptophan or an equivalent compound; allocryptine; choline; diadzin; diadzein; damiana (*Turnera diffusa*); evening primrose oil; glutathione or a glutathione equivalent; inositol; kudzu; lobelia; cysteine; glutamine; L-methionine; linoleic acid; gamma-linoleic acid; magnesium; milk thistle extract (silymarin); niacin; PABA; protopine; puerarin; pyridoxal-5-phosphate; St. Johnswort; yellow dock; and zinc.
10. The composition of any of claims 1-3, wherein said substituent (B) that provides traditional psychological feedback is selected from the group consisting of:
Caffeine; theophylline; theobromine; cola; carbonic acid; phosphoric acid; citric acid; hops; cocoa; chocolate; anandamide; quinine; malic acid; non-citric fruit juice or juice extract; milk; vegetable juice or juice extract; kudzu; and 5-

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hydroxy-tryptophan.

11. The composition of claim 4, wherein said substituent (B) that provides traditional psychological feedback is selected from the group consisting of:
Caffeine; theophylline; theobromine; cola; carbonic acid; phosphoric acid;
citric acid; hops; cocoa; chocolate; anandamide; quinine; malic acid; non-citric
fruit juice or juice extract; milk; vegetable juice or juice extract; kudzu; and 5-hydroxy-tryptophan.
12. The composition of claim 5, wherein said substituent (B) that provides traditional psychological feedback is selected from the group consisting of:
Caffeine; theophylline; theobromine; cola; carbonic acid; phosphoric acid;
citric acid; hops; cocoa; chocolate; anandamide; quinine; malic acid; non-citric
fruit juice or juice extract; milk; vegetable juice or juice extract; kudzu; and 5-hydroxy-tryptophan.
13. The composition of claim 6, wherein said substituent (B) that provides traditional psychological feedback is selected from the group consisting of:
Caffeine; theophylline; theobromine; cola; carbonic acid; phosphoric acid;
citric acid; hops; cocoa; chocolate; anandamide; quinine; malic acid; non-citric
fruit juice or juice extract; milk; vegetable juice or juice extract; kudzu; and 5-hydroxy-tryptophan.
14. The composition of claim 7, wherein said substituent (B) that provides traditional psychological feedback is selected from the group consisting of:
Caffeine; theophylline; theobromine; cola; carbonic acid; phosphoric acid;
citric acid; hops; cocoa; chocolate; anandamide; quinine; malic acid; non-citric
fruit juice or juice extract; milk; vegetable juice or juice extract; kudzu; and 5-hydroxy-tryptophan.
15. The composition of claim 4, wherein said substituent (C) that provides long term psychological feedback is selected from the group consisting of:
5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; Allocryptine; California Poppy; Chromium Picolinate; Chromium Polynicotinate; Cocoa; Damiana (*Turnera diffusa*); D-

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phenylalanine; Ephedra nevadensis; Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoepinephrine; Pyridoxal-5-phosphate; Red rice yeast; Serotonin; and St. Johnswort.

- 5 16. The composition of claim 5, wherein said substituent (C) that provides long term psychological feedback is selected from the group consisting of:
- 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; Allocryptine; California Poppy; Chromium Picolinate; Chromium Polynicotinate; Cocoa; Damiana (*Turnera diffusa*); D-phenylalanine; Ephedra nevadensis; Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoepinephrine; Pyridoxal-5-phosphate; Red rice yeast; Serotonin; and St. Johnswort.
- 10
- 15 17. The composition of claim 6, wherein said substituent (C) that provides long term psychological feedback is selected from the group consisting of:
- 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; Allocryptine; California Poppy; Chromium Picolinate; Chromium Polynicotinate; Cocoa; Damiana (*Turnera diffusa*); D-phenylalanine; Ephedra nevadensis; Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoepinephrine; Pyridoxal-5-phosphate; Red rice yeast; Serotonin; and St. Johnswort.
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- 25 18. The composition of claim 7, wherein said substituent (C) that provides long term psychological feedback is selected from the group consisting of:
- 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; Allocryptine; California Poppy; Chromium Picolinate; Chromium Polynicotinate; Cocoa; Damiana (*Turnera diffusa*); D-phenylalanine; Ephedra nevadensis; Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoepinephrine; Pyridoxal-5-phosphate; Red rice yeast; Serotonin; and St. Johnswort.
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19. The composition of claim 4, wherein said substituent (D) that provides short term psychological feedback is selected from the group consisting of:
Anandamide; an Alcohol Enhancer; a standard flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Tumeric; and Wormwood.
20. The composition of claim 5, wherein said substituent (D) that provides short term psychological feedback is selected from the group consisting of:
Anandamide; an Alcohol Enhancer; a standard flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Tumeric; and Wormwood.
21. The composition of claim 6, wherein said substituent (D) that provides short term psychological feedback is selected from the group consisting of:
Anandamide; an Alcohol Enhance; a standard flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Tumeric; and Wormwood.
22. The composition of claim 7, wherein said substituent (D) that provides short term psychological feedback is selected from the group consisting of:
Anandamide; an Alcohol Enhancer; a standard flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Tumeric; and Wormwood.
23. The composition of claim 4, wherein said composition contains more than one of said long term psychological feedback substituent (C).
24. The composition of claim 5, wherein said composition contains more than one of said long term psychological feedback substituent (C).
25. The composition of claim 6, wherein said composition contains more than one of said long term psychological feedback substituent (C).
26. The composition of claim 7, wherein said composition contains more than one of said long term psychological feedback substituent (C).

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27. The composition of claim 4, wherein said composition contains more than one of said short term psychological feedback substituent (D).
28. The composition of claim 5, wherein said composition contains more than one of said short term psychological feedback substituent (D).
- 5 29. The composition of claim 6, wherein said composition contains more than one of said short term psychological feedback substituent (D).
30. The composition of claim 7, wherein said composition contains more than one of said short term psychological feedback substituent (D).
31. The composition of claim 4, wherein said composition is a beverage, and wherein said
10 substituent (B) of said beverage is caffeine.
32. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is cola.
33. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is carbonic acid.
- 15 34. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is phosphoric acid.
35. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is citric acid.
36. The composition of claim 4, wherein said composition is a beverage, and wherein said
20 substituent (B) of said beverage is hops.
37. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is selected from the group consisting of cocoa; chocolate and an anandamide.
38. The composition of claim 4, wherein said composition is a beverage, and wherein said
25 substituent (B) of said beverage is malic acid.

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39. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is quinine.
40. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is a sweetener.
- 5 41. The beverage of claim 40, wherein said sweetener is selected from the group consisting of fructose; high fructose corn syrup; sucrose; maltose; glucose; lactose; sorbitol; and galactose.
42. The beverage of claim 40, wherein said sweetener is selected from the group consisting of aspartame, saccharin, an L-sugar, and a cyclamate.
- 10 43. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is a fruit juice or fruit juice extract.
44. The beverage of claim 43, wherein said fruit juice or fruit juice extract comprises a juice or extract from a fruit selected from the group consisting of apple; pineapple; grape; pear; banana; plum; cherry; peach; strawberry; blueberry; cranberry; 15 blackberry; orange; grapefruit; lemon; and lime.
45. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is milk.
46. The composition of claim 4, wherein said composition is a beverage, and wherein said substituent (B) of said beverage is a vegetable juice or vegetable juice extract.
- 20 47. The composition of claim 2, wherein said nutritionally beneficial substituent is kudzu.
48. The composition of claim 2, wherein said nutritionally beneficial substituent is milk thistle.
49. The composition of claim 2, wherein said nutritionally beneficial substituent is a bioavailable zinc compound.
- 25 50. A composition for human consumption, comprising:

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at least one nutritionally beneficial substituent (A), said substituent being present in an amount sufficient to provide a nutritional benefit to said human recipient; and at least one additional substituent (C) that provides long term psychological feedback substituent or at least one additional substituent (D) that provides short term psychological feedback;

wherein said substituent (C) that provides said long term psychological feedback is selected from the group consisting of:

an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine; theophylline; theobromine; California poppy; calcium; chromium picolinate; chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana (*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine; GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine; pseudoepinephrine; pyridoxal-5-phosphate; serotonin; sucrose; fructose; glucose; high fructose corn syrup; red rice yeast; and St. Johnswort;

and

said substituent (D) that provides said short term psychological feedback is selected from the group consisting of:

an anandamide; an alcohol enhancer; angelica root; balm; bitter orange (*Aurant pericarpium*); bogbean; boldo; calamus; California poppy; capsicum; caraway; cayenne; chamomile; cinchona bark; quinine; chocolate; cinnamon; clove; cocoa; condurango; dandelion; elecampane; GABA; gentian; ginger; ginseng; holy thistle; hops; horehound; dried lemon peel (*Citri pericardium*); mugwort; unripe orange; peppermint; quassia; red sage; rosemary; star anise; thyme; tumeric; wormwood; yarrow; and zinc;

and provides a short term sensation of warmth, tingling, excitement, tranquility and well-being, or a distinctive, intense, bitter or unusual taste.

51. The composition of claim 50, wherein said substituent (C) that provides long term psychological feedback is selected from the group consisting of:

5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; Allocryptine; California Poppy; Chromium

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Picolinate; Chromium Polynicotinate; Cocoa; Damiana (*Turnera diffusa*); D-phenylalanine; Ephedra nevadensis; Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoepinephrine; Pyridoxal-5-phosphate; Red rice yeast; Serotonin; and St. Johnswort.

52. The composition of claim 50, wherein said substituent (D) that provides short term psychological feedback is selected from the group consisting of:
Anandamide; an Alcohol Enhance; a standard flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Turmeric; and Wormwood.
53. The composition of claim 50, wherein said composition is a beverage.
54. The composition of claim 53, wherein said beverage is substantially alcohol-free.
55. The composition of claim 40, wherein said composition contains at least one of said substituent (C) that provides said long term psychological feedback.
56. The composition of claim 50, wherein said composition contains at least one of said substituent (D) that provides said short term psychological feedback.
57. The composition of claim 50, wherein said composition contains both at least one of said substituent (C) that provides said long term psychological feedback, and at least one of said substituent (D) that provides said short term psychological feedback.
58. The composition of claim 50, wherein said composition is a beverage, and wherein said beverage contains at least one substituent (B) that provides traditional psychological feedback, wherein said substituent (B) is selected from the group consisting of:
caffeine or a caffeine equivalent; tryptophan; ephedra; cola; green tea extract; carbonic acid; phosphoric acid; citric acid; hops; cocoa; chocolate; an anandamide; quinine; malic acid; a sweetener; a fruit juice or fruit juice extract; milk; a vegetable juice or vegetable juice extract; kudzu and 5-hydroxy-tryptophan.

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59. The composition of claim 58, wherein said substituent (B) of said beverage is cola or caffeine.
60. The composition of claim 58, wherein said substituent (B) of said beverage is carbonic acid.
- 5 61. The composition of claim 58, wherein said substituent (B) of said beverage is phosphoric acid.
62. The composition of claim 58, wherein said substituent (B) of said beverage is citric acid.
63. The composition of claim 58, wherein said substituent (B) of said beverage is hops.
- 10 64. The composition of claim 58, wherein said substituent (B) of said beverage is selected from the group consisting of cocoa; chocolate and an anandamide.
65. The composition of claim 58, wherein said substituent (B) of said beverage is malic acid.
66. The composition of claim 58, wherein said substituent (B) of said beverage is quinine.
- 15 67. The composition of claim 58, wherein said substituent (B) of said beverage is a sweetener.
68. The composition of claim 67, wherein said sweetener is selected from the group consisting of fructose; high fructose corn syrup; sucrose; maltose; glucose; lactose; sorbitol; and galactose.
- 20 69. The composition of claim 67, wherein said sweetener is selected from the group consisting of aspartame, saccharin, an L-sugar, and a cyclamate.
70. The composition of claim 58, wherein said substituent (B) of said beverage is a fruit juice or fruit juice extract.
- 25 71. The beverage of claim 70, wherein said fruit juice or fruit juice extract comprises a juice or extract from a fruit selected from the group consisting of apple; pineapple;

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grape; pear; banana; plum; cherry; peach; strawberry; blueberry; cranberry;
blackberry; orange; grapefruit; lemon; and lime.

72. The composition of claim 58, wherein said substituent (B) of said beverage is milk.

5 73. The composition of claim 58, wherein said substituent (B) of said beverage is a vegetable juice or vegetable juice extract.

74. A method for providing a nutritionally beneficial substituent (A) to a human,
comprising administering or providing to said human a composition containing:
said nutritionally beneficial substituent (A) in an amount sufficient to provide said
nutritional benefit to said human recipient; and
10 at least one additional substituent (C) that provides long term psychological feedback
substituent or at least one additional substituent (D) that provides short term
psychological feedback;
wherein said substituent (C) that provides said long term psychological feedback is
selected from the group consisting of:

15 an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-
fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine;
theophylline; theobromine; California poppy; caldum; chromium picolinate;
chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana
(*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine;
20 GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca
virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine;
pseudoepinephrine; pyridoxal-5-phosphate; serotonin; sucrose; fructose;
glucose; high fructose corn syrup; red rice yeast; and St. Johnswort; and

and

25 said substituent (D) that provides said short term psychological feedback is selected
from the group consisting of:

30 an anandamide; an alcohol enhancer; angelica root; balm; bitter orange
(*Aurant pericarpium*); bogbean; boldo; calamus; California poppy;
capsicum; caraway; cayenne; chamomile; cinchona bark; quinine;
chocolate; cinnamon; clove; cocoa; condurango; dandelion; elecampane;
GABA; gentian; ginger; ginseng; holy thistle; hops; horehound; dried lemon

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peel (*Citri pericardium*); mugwort; unripe orange; peppermint; quassia; red sage; rosemary; star anise; thyme; tumeric; wormwood; yarrow; and zinc; and provides a short term sensation of warmth, tingling, excitement, tranquility and well-being, or a distinctive, intense, bitter or unusual taste.

- 5 75. The method of claim 74, wherein said substituent (C) that provides long term psychological feedback is selected from the group consisting of:
 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; Allocryptine; California Poppy; Chromium Picolinate; Chromium Polynicotinate; Cocoa; Damiana (*Turnera diffusa*); D-phenylalanine; Ephedra nevadensis; Ephedrine; Epinephrine; GABA; L-glutamine; Green Tea; Kava Kava; Lactuca Virosa; Lobelia; Magnesium; Maraba; Protopine; Pseudophedrine; Pseudoepinephrine; Pyridoxal-5-phosphate; Red rice yeast; Serotonin; and St. Johnswort.
- 10
- 15 76. The method of claim 74, wherein said substituent (D) that provides short term psychological feedback is selected from the group consisting of:
 Anandamide; an Alcohol Enhance; a standard flavorants; Angelica root; Boldo; California Poppy; Capsaicum; Cayenne; GABA; Gentian; Tumeric; and Wormwood.
- 20 77. The method of claim 74, wherein said composition is a beverage.
78. The method of claim 77, wherein said beverage is substantially alcohol-free.
79. The method of claim 74, wherein said composition contains at least one of said substituent (C) that provides said long term psychological feedback.
80. The method of claim 74, wherein said composition contains at least one of said substituent (D) that provides said short term psychological feedback.
- 25 81. The method of claim 74, wherein said composition contains both at least one of said substituent (C) that provides said long term psychological feedback, and at least one of said substituent (D) that provides said short term psychological feedback.

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82. The method of claim 74, wherein said composition is a beverage, and wherein said beverage contains at least one substituent (B) that provides traditional psychological feedback, wherein said substituent (B) is selected from the group consisting of:

5 caffeine or a caffeine equivalent; tryptophan; ephedra; cola; green tea extract; carbonic acid; phosphoric acid; citric acid; hops; cocoa; chocolate; an anandamide; quinine; malic acid; a sweetener; a fruit juice or fruit juice extract; milk; a vegetable juice or vegetable juice extract; kudzu and 5-hydroxy-tryptophan.

- 10 83. An aqueous beverage composition for human consumption containing kudzu in liquid form, tryptophan or an analogue thereof, milk thistle, or bioactive zinc dissolved or suspended in water.

84. A composition for human consumption, comprising two, three, four or five nutritionally beneficial substituents (A) selected from the group consisting of

15 adrenochrome semicarbazone; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluoro-tryptophan; 6-fluorotryptophan; tryptophan; acetosalicylic acid; ibuprophen; acetaminophen; alfalfa; allocryptine; beta-carotene; calcium; caffeine; theophylline; theobromine; choline; chromium picolinate; chromium polynicotinate; diadzin; diadzein; damiana; turnera diffusa; dandelion; evening
20 primrose oil; folic acid; GABA; ginger; ginkgo biloba; ginseng; glutathione; cysteine; L-glutamine; glycine; N-acetylcysteine; L-cysteine and L-methionine; S-adenosylmethionine; green tea; guarana; hops; inositol; iron; kava kava; kombucha tea; kudzu; lobelia; glutamic acid; D-phenylalanine; DL-phenylalanine; L-tyrosine;
25 lecithin; linoleic acid; gamma-linoleic acid; magnesium; milk thistle extract (silymarin); niacin; PABA; protopine; puerarin; pyridoxal-5-phosphate; selenium; soluble fiber; St. Johnswort; taurine; sucrose; fructose; glucose; yellow dock; zinc and zinc picolinate; and zinc polynicotinate.

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85. A composition for human consumption, comprising two, three, four or five substituents (C) that provide long term psychological feedback, wherein said nutritionally beneficial substituents (C) are selected from the group consisting of:

5

10

an anandamide; 5-hydroxytryptophan; 5-fluoro-A-methyltryptamine; 5-fluorotryptophan; 6-fluorotryptophan; tryptophan; allocryptine; caffeine; theophylline; theobromine; California poppy; calcium; chromium picolinate; chromium polynicotinate; chicalote extract; cocoa; chocolate; Damiana (*Turnera diffusa*); DL-phenylalanine; ephedra; ephedrine; epinephrine; GABA; ginger; ginseng; L-glutamine; green tea; guarana; kava kava; lactuca virosa; L-tyrosine; lobelia; magnesium; maraba; protopine; pseudophedrine; pseudoepinephrine; pyridoxal-5-phosphate; red rice yeast; serotonin; sucrose; fructose; glucose; high fructose corn syrup; and St. Johnswort.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/11886

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61K 35/78; A23F 5/00; A23L 2/00; C12C 3/00; A23J 1/00; A23G 3/00

US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/195.1; 426/72, 534, 590, 593, 594, 599, 600, 615, 655, 656, 658

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| Y | US 5,641,532 A (PFLAUMER et al) 24 June 1997, see entire document | 1-85 |
| Y | US 5,547,671 A (DUTHINH) 20 August 1996, see entire document. | 1-85 |
| Y | US 5,455,235 A (TAKAICHI et al) 03 October 1995, see entire document | 1-85 |
| Y | US 5,431,940 A (CALDERAS et al) 11 July 1995, see entire document. | 1-85 |
| Y | US 4,992,282 A (MEHANSO et al) 12 February 1991, see entire document. | 1-85 |
| Y | US 4,612,205 A (KUPPER et al) 16 September 1986, see entire document. | 1-85 |

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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Date of the actual completion of the international search
17 AUGUST 1999Date of mailing of the international search report
13 September 1999 (13.09.99)Name and mailing address of the ISA/US
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/11886

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|---|--|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| Y | US 4,061,797 A (HANNAN, JR. et al) 06 December 1977, see entire document. | 1-85 |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/11886

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

424/195.1; 426/72, 534, 590, 593, 594, 599, 600, 615, 655, 656, 658

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